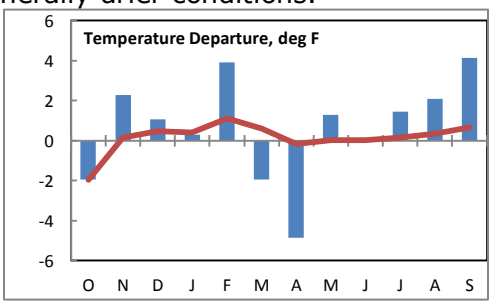
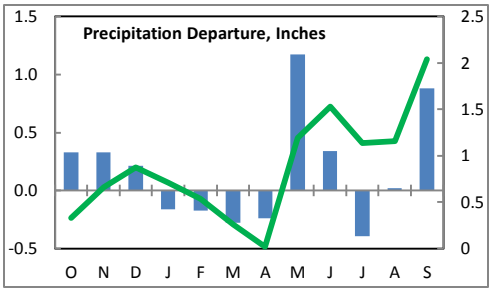
Montana Weather/Precipitation Summary

September 2013 by NOAA's National Weather Service Great Falls Montana

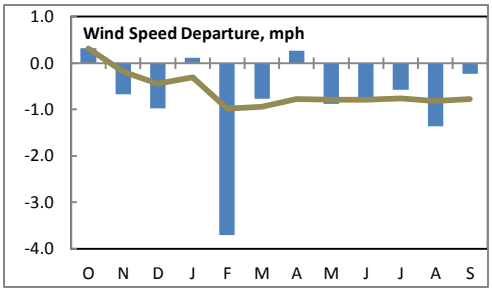
Temperatures averaged above normal across the state in September. A ridge of high pressure dominated eastern Montana, while trough of low pressure was along the west coast. Precipitation was mostly above normal. The ridge of high pressure over the western United States was stronger than normal. The ridge contributed to warmer and generally drier conditions.



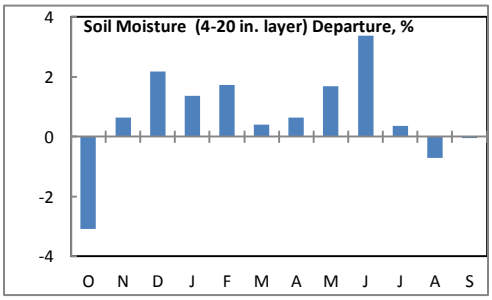
Statewide composite temperatures averaged 4.2°F above normal for the month. Figure 2 shows that all but the extreme northeast was above normal, as much as 7°F. The below normal area in the northeast was as much as 1.5°F below normal. Sonnette had the largest warm departure from normal (7.5°F). Belgrade had the smallest positive, 0.9°F above normal. The warmest average August temperature was 67.4°F at Glendive, and the coolest was 45.0°F at Yellow Mule RAWS. For the past 12-months, the statewide composite average temperature is 0.7°F above normal. The figure to the right shows that this is the fifth consecutive month with composite above normal temperatures in Montana. Figure 3 shows that Montana was part of a much larger portion of western and northern North America with above normal temperatures in August.



The monthly departure from normal for precipitation across Montana is shown in Figure 4. This figure shows above normal precipitation across most of the state, with small areas of below normal in central Montana and the eastern border. The driest areas were over portions of central Montana and the eastern border. The heaviest precipitation fell over western Glacier and Pondera counties. This area received nearly six inches of rain. The precipitation figure to the right shows that September had a 0.9" positive departure. The statewide composite precipitation for the past 12 months is 2.04-inches above normal.



On a statewide average, winds continued below normal in September. This September was the 13th calmest of record, with an average speed of 7.8-mph. Only three of the past 12-months have had wind speeds averaging above normal. The fastest measured gust of the month, 80 mph, occurred near Polaris in Beaverhead County. Severe thunderstorms produced very strong winds and damaging hail across Beaverhead, Madison and Gallatin Counties on the first. For the past 12-months, winds are running 0.8-mph below average.



Statewide composite soil moisture conditions were at normal in September. For the past 11 months, soil moisture values have been near to above normal across the state. This September ranks as the sixth wettest of record(with records starting in 1995) (see soil moisture figure to right). Refer to NCDC's State of the Climate report for the latest monthly discussion: http://www.ncdc.noaa.gov/sotc/.

September 1-17

The first half of the month was generally warm. With the warm temperatures, there were several days with thunderstorms. The warmest day occurred on the fifth when Brandenberg reached 102°F. Also on the fifth, thunderstorms in the Whitehall area caused damage to buildings. Gusts

to 79 mph were recorded near Cardwell. On the sixth, thunderstorms spread over most of the state. Golf ball size hail fell near Craig, with 69 mph gusts reported near Millegan (Cascade). Heavy rain fell along the Rocky Mountain Front. Heart Butte reported 3.20 inches. Thunderstorms on the seventh produced wind gusts to 73 mph near Huntley. As the storms moved across southeast Montana, nearly six inches of rain fell near Baker, with 4.50-inches reported near Opheim. Again on the eighth, thunderstorms in central Montana produced up to two inch hail near Stockett (Cascade). Warm temperatures pushed to record levels across western Montana on the 12th and 13th. Missoula hit 91F on the 12th. A strong cold front swept across the state on the 16th. This effectively brought an end to the heat. Thunderstorms along the front caused wind gusts of 62 mph at Martinsdale (Meagher), and caused a small plane to be flipped over while taxiing at the Belgrade airport. This front continued to produce thunderstorms along the eastern border on the 17th. Gusts from these storms reached 83 mph near Bloomfield, in Dawson County.

September 18-24
This period was one of weather changes on a near daily basis. After a cool-down on the 18th and 19th, temperatures rebounded into the 80s on the 20th and 21st. Heavy rain fell across northwest Montana on the 18th, with up to two inches near Bigfork. Widespread frost was observed over western Montana on the 20th. A round of thunderstorms brought strong and gusty winds to southwest Montana on the 24th. Gusts reached 60 mph at Dillon and 63 mph at Livingston.

September 25 - 31
The last few days of the month brought the first snows to a larger portion of west and southwest Montana. Amounts of up to 18 inches were reported near Butte. This caused significant tree damage in the Butte area. Up to 10 inches of snow fell across the Little Belts and Castle Mountains. Over south central Montana, Cole Creek reported six inches, while Red Lodge received 2.5 inches. Very windy conditions occurred across central Montana on the 28th through 30th. Winds to 80 mph occurred over the mountains, while gusts reached 76 mph near Cascade and 74 mph near Fort Benton. Again, the wind caused significant tree damage in central Montana. Meanwhile, heavy precipitation fell west of the divide.

Precipitation/convection

Severe convective weather occurred on seven days in September. The normal for the month is two days. The seven days set a record for number of days of reported severe weather. The previous record was six days in 1997.

Water Year
For the water-year-to-date (October through September), the statewide mean temperature was 44.0°F, 0.7°F above normal. This is the 40th warmest of record. Statewide precipitation has averaged 17.47-inches, 2.05-inches above normal. This is the 18th wettest of record. Mean wind speeds were 8.5-mph, or 0.7-mph below normal. This has been the 13th calmest season.

September summary information:

High Temperature	102°F at Brandenberg (5th)	**Greatest Precip**	6.53" at Mystic Lake
Low Temperature	17°F at Wisdom and Gates Park (27th)		12.00" Poorman Creek (Lincoln)
Warmest Ave Temp	67.4°F at Glendive	**Peak Wind Gust**	80 mph at Deep Creek RAWS (Glacier) (28th)
Coolest Ave Temp	45.0°F at Yellow Mule RAWS		83 mph near Bloomfield (Dawson) (17th)
Range of Temp departures	+0.9°F at Belgrade to +7.5° at Sonnette	**Highest Ave Wind**	13.7 mph at Deep Creek RAWS 12.7 mph at Sweet Grass
21 city mean monthly Temperature/Normal	60.4/56.2F 4.2F above normal. 12th warmest of record (since 1880). 88th percentile.	**20 city mean monthly wind speed/Normal**	7.8 mph/8.0 mph; 13th calmest of record (since 1936). 18th percentile
22 city mean monthly precipitation/Normal	2.12/1.24" – 171% of normal. 13th wettest of record (since 1880). 88th percentile		

Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date

Location	Sep	% of Norm	Rank	Pcntl	Oct 1 – Sep 30	% of norm	Rank	Pcntl	Years
Baker	1.20	105%			20.75	178%			15
Billings	3.63	271%	110	97	13.86	94%	70	64	109
Belgrade	2.47	225%	70	91	13.08	93%	29	37	76
Butte	2.99	299%	116	97	11.91	93%	52	44	118
Cut Bank	2.68	220%	98	92	15.73	145%	93	88	105
Dillon	2.46	293%	73	99	10.57	101%	46	63	73
Glasgow	1.83	195%	99	84	16.62	143%	101	89	113
Great Falls	0.84	59%	45	36	13.07	89%	43	35	121
Havre	2.05	183%	118	88	19.63	175%	131	98	133
Helena	1.46	133%	96	71	12.88	115%	84	62	135
Jordan	1.16	96%			17.72	140%			15
Kalispell	2.41	175%	107	89	18.42	108%	94	79	119
Lewistown	2.35	174%	98	83	22.62	134%	107	91	117
Livingston	2.31	191%	93	84	12.13	82%	28	26	105
Miles City	1.59	147%	111	81	16.96	136%	115	84	136
Missoula	1.42	123%	92	68	12.52	88%	43	33	127
Mullan Pass	6.11	382%	72	97	48.67	128%	64	90	71
Wolf Point	1.15	114%			13.85	114%			15
Glendive	0.57	45%	44	37	17.73	131%	90	82	109
Sidney	0.45	36%	20	26	18.93	132%	64	89	72
BZN-MSU	3.00	214%	121	90	18.19	92%	61	48	126

Rankings and Percentiles are 1=driest, higher numbers=wetter.
For an automated version of this chart, updated daily, go to
http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS

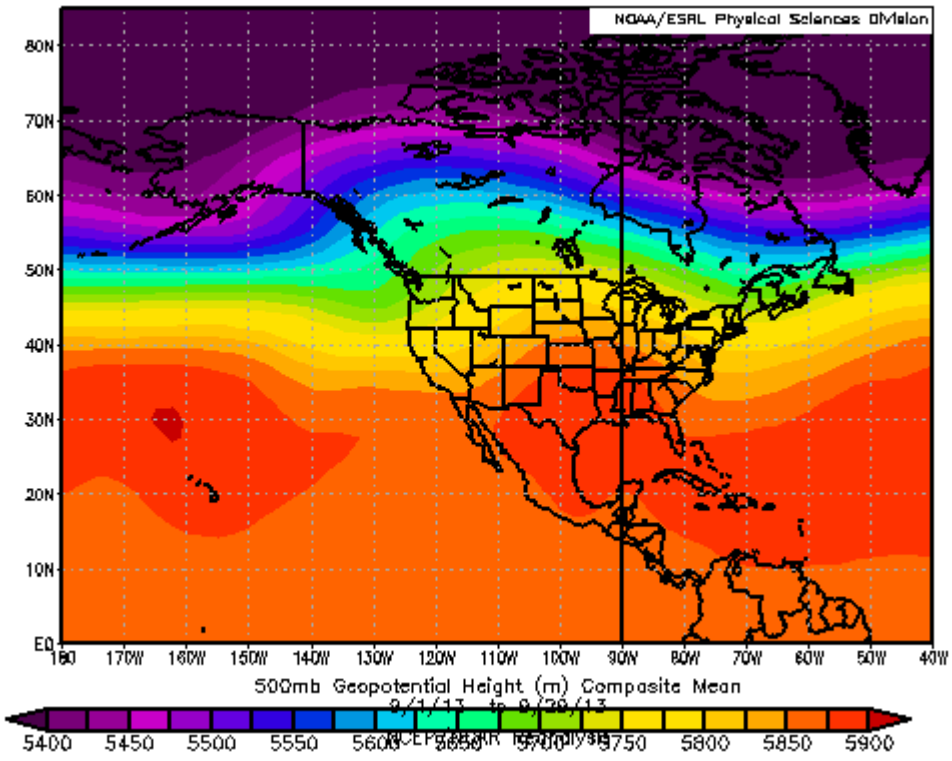


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month. Heights were above normal across eastern Montana. This contributed to the warmer conditions.

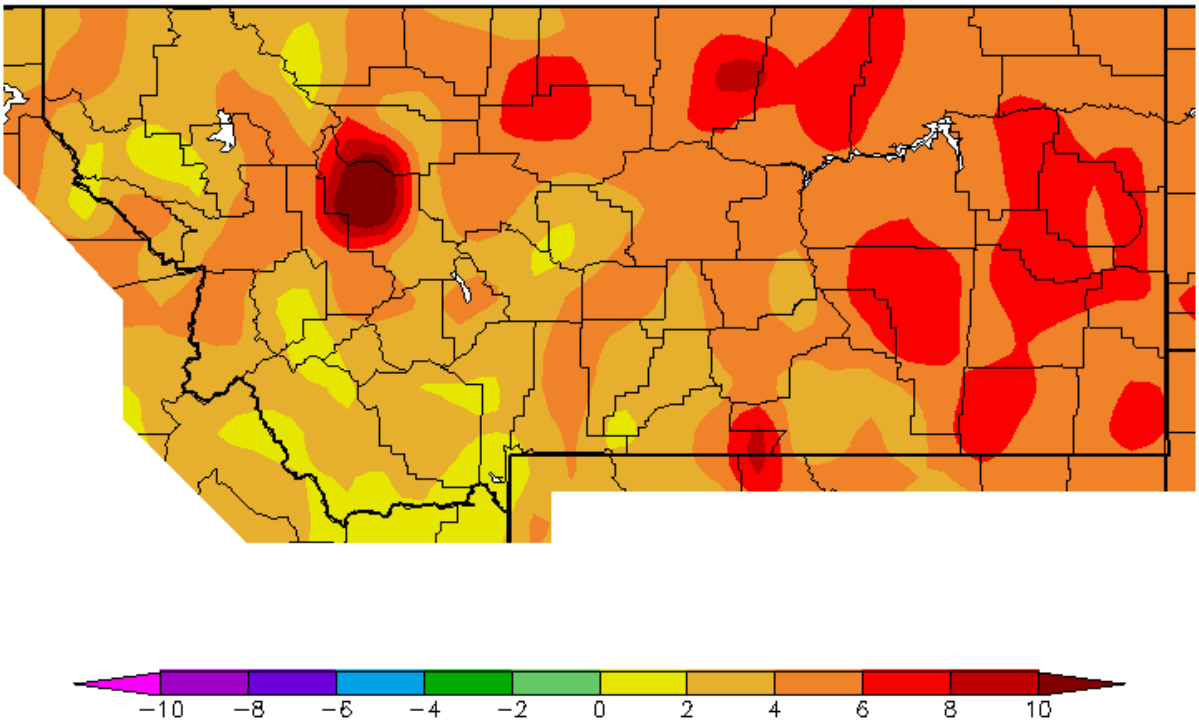


Figure 2. September 2013 temperature departures from normal (°F) (Western Region Climate Center).

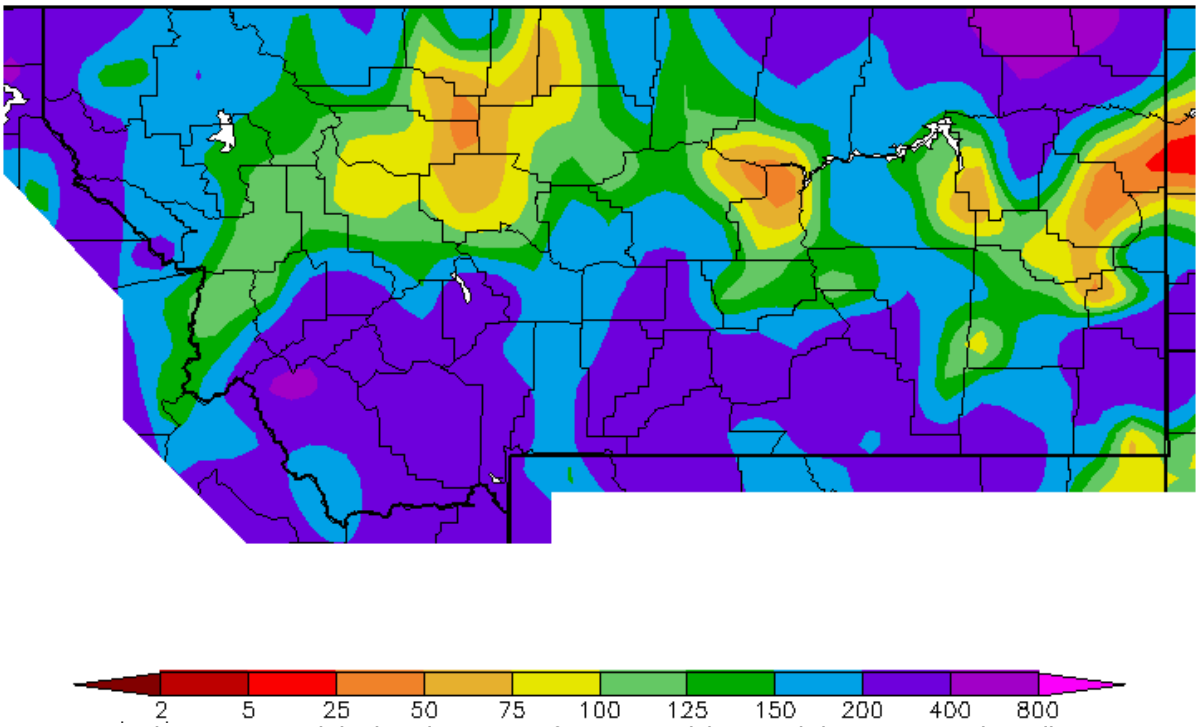


Figure 4. September 2013 precipitation departures from normal (percent) (Western Region Climate Center).

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to: http://www.wrh.noaa.gov/tfx/image.php?wfo=tfx&type=data&loc=hydro&fx=watyr_pcntnorm.png

For the latest information on mountain snow pack from the NRCS, go to: http://www.mt.nrcs.usda.gov/snow/index.html

For the latest U.S. Drought Monitor, issued weekly by the Climate Prediction Center (CPC), go to: http://www.drought.unl.edu/dm/monitor.html

These data are preliminary and have not undergone final QC by NCDC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Climatic Data Center (NCDC) http://www.ncdc.noaa.gov. Many more links are on the Drought Information Page of the NWS Great Falls web site at http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tfx. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.